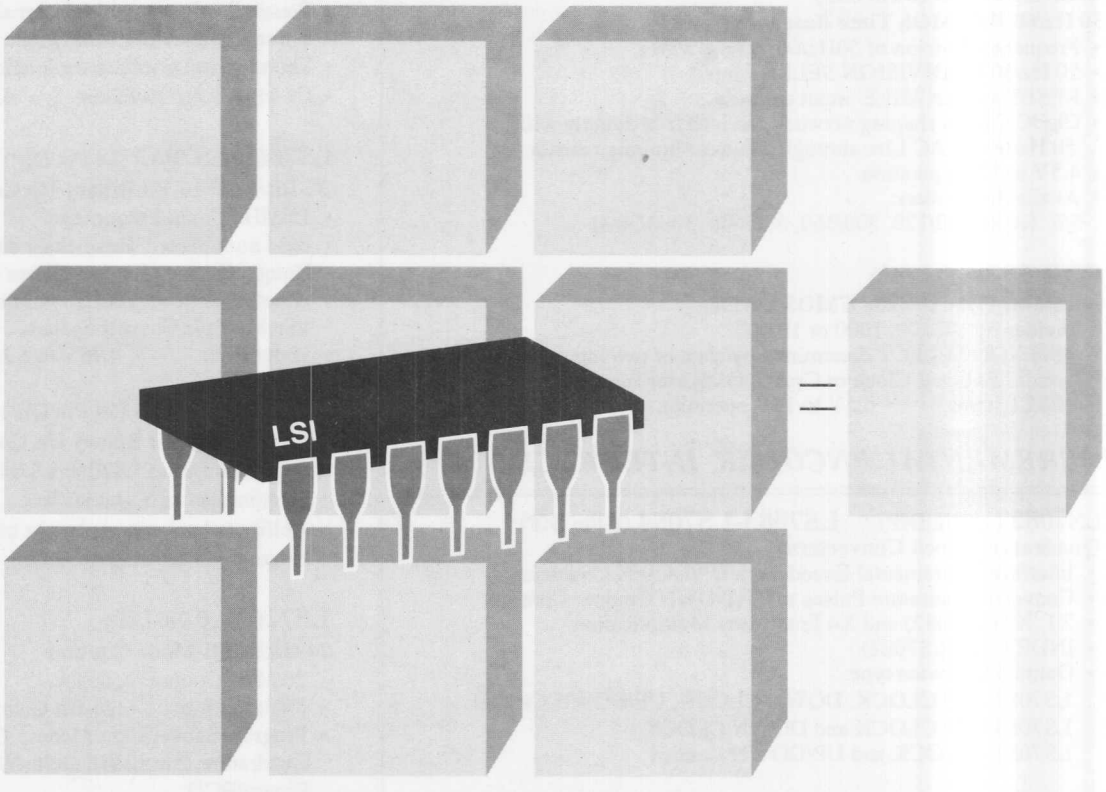
LSI/CSI

Since 1969

LSI Computer Systems, Inc.



Short Form Catalog

ISO 9002 UL REGISTERED FIRM A3800

1235 Walt Whitman Road
Melville, NY 11747

Tel. (516) 271-0400
Fax. (516) 271-0405

PROGRAMMABLE DIGITAL DELAY TIMERS

LS7210 (14 Pin DIP)
Programmable Digital Delay Timer
- Generates delays from milliseconds to "infinity"
- Delays programmed by 5 Binary Weighted inputs and time-base
- External clock or RC oscillator sources time-base
- Four selectable Operating Modes:
  DUAL DELAY DELAYED OPERATE
  ONE-SHOT DELAYED RELEASE
- 4.75V to 15V operation

LS7211-LS7212 (18 Pin DIP)
CMOS Programmable Digital Delay Timer
- Generates delays from nanoseconds to "infinity"
- Time Base is External Clock or
  RC Oscillator (LS7211)/Crystal Oscillator (LS7212)
- 8 Binary-Weighted Delay Bits • 3 Selectable Prescalers
- Four Operating Modes • Reset for Delay Abort
- 4V to 18V Operation

DIVIDERS

RED SERIES (8 Pin DIP)
50 Hz/60 Hz CMOS Time Base Generators
- Frequency division of 50Hz/60Hz sine waves
- 50 Hz/60 Hz DIVISION SELECT input
- RESET and ENABLE input controls
- CLOCK input shaping network can interface directly with 50 Hz/60 Hz AC Line through a current limiting resistor
- 4.5V to 15V operation
- Available Dividers:
  5/6, 50/60, 100/120, 300/360, 500/600, 3000/3600

RDD 104 (8 Pin DIP)
Selectable Four Decade CMOS Divider
- Divides by 10, 100, 1000 or 10,000
- DIVISION SELECT determined by state of two inputs
- Divides External Clock or Crystal Oscillator frequency
- RESET input • 4.5V to 15V operation

INCREMENTAL ENCODER INTERFACE

LS7082 (14 Pin DIP) **LS7083-LS7084** (8 Pin DIP)
Quadrature Clock Converters
- Interfaces Incremental Encoders to UP/DOWN Counters
- Converts Quadrature Pulses to UP/DOWN Counter Controls
- X1, X2 (LS7082) and X4 Frequency Multiplication
- INDEX I/O (LS7082)
- Outputs by device type:
  LS7082 - UP CLOCK, DOWN CLOCK, UP/DOWN Control
  LS7083 - UP CLOCK and DOWN CLOCK
  LS7084 - CLOCK and UP/DOWN Control

LS7166 (20 Pin DIP)
24-Bit Quadrature Pulse Counter
- Interfaces Incremental Encoders to Microprocessor Bus
- 1.2 MHz Count Frequency in X4 Quadrature Mode
- X1, X2, X4 Frequency Multiplication
- 8-Bit I/O Bus • 24-Bit Comparator
- TTL and CMOS compatible • 4.5V to 5.5V operation

LS7266R1 (28 Pin DIP)
24-Bit Dual-Axis Quadrature Pulse Counter
- Same features as LS7166 except as shown below:
- Dual architecture to support X and Y axes
- Digital filtering of Quadrature clocks
- Programmable 8-Bit filter clock prescalers
- Error flag for excessive noise indication
- Programmable Count Range Limits
- Programmable Index input
- 17 MHz Count Frequency in X4 Quadrature Mode

COUNTERS

LS7030-LS7031 (40 Pin DIP)
Eight Decade/Six Decade Up Counter with Eight Decade Latch
- 10 MHz Count Frequency • 4.75V to 15V operation
- Multiplexed BCD and 7-Segment (LS7030) data outputs
- Leading Zero Blanking output • On-chip Scan Oscillator
- Decimal Point and Overflow control inputs
- The LS7031 can latch external prescalers into the two LSD latches for counting to 1 GHz

LS7040 (40 Pin DIP)
Dual Three Decade Up/Down Counter
- 350 KHz Count Frequency
- Fully Synchronous counting • Cascadable
- Separate Reset and Enable controls for each three decade counter
- Parallel BCD outputs • 4.75V to 15V operation

LS7055-LS7056 (40 Pin DIP)
Six Decade Pre-Determining Up/Down Counter
- 250 KHz Count Frequency
- Fully Synchronous counting
- Multiplexed BCD and 7 Segment data outputs
- Preset, Presignal and Mainsignal Storage Registers
- Three Comparators with Output Flags
- Thumbwheel interface for loading registers
- On-chip Scan Oscillator • 4.75V to 15V operation

LS7060/LS7062 (18 Pin DIP)
32-Bit/Dual 16-Bit Binary Up Counter
- 15 MHz Count Frequency
- Byte multiplexed Three-State data outputs
- Unique Cascade Feature allows data bytes from many counters to be sequentially multiplexed to the output bus in a Multiple Counter System
- 32-bit latch • 4.75V to 5.25V operation

LS7061/LS7063 (24 Pin DIP)
32-Bit/Dual 16-Bit Binary Up Counter
- Same features as LS7060/LS7062 except there is a 40-bit latch instead of 32-bit latch
- Ability to latch external eight bits allows attachment of external pre-scaler for counting to 3.84 GHz

LS7166 (20 Pin DIP)
24-Bit Multi-Mode Counter
- 20 MHz Count Frequency
- 8-Bit I/O bus • 24-Bit Comparator
- Programmable Count Modes: Quadrature (X1, X2, X4)/Non-Quadrature, Normal/Modulo-N/24 Hour Clock/Non-Recycle, Binary/BCD
- TTL and CMOS compatible • 4.5V to 5.5V operation

LS7266R1 (28 Pin DIP)
24-Bit Dual Multi-Mode Counter
- 30 MHz Count Frequency
- 8-Bit I/O Bus
- Dual 24-Bit Comparator
- Programmable Count Modes: Quadrature (X1, X2, X4)/Non-Quadrature, Normal/Modulo-N/Range Limit/Non-Recycle, Binary/BCD
- TTL and CMOS compatible
- 4.5V to 5.5V operation

LIGHTING CONTROLS

LS6501 (16 Pin DIP)
PIR Motion Detector Interface
- Direct Interface to PIR Sensor
- Two-Stage Differential Amplifier-Filter
- Amplifier-Filter Characteristics Externally Programmable
- Noise Rejection Circuitry • Selectable On-Time and Dead-Time
- Ambient Light Inhibit • Regulated 5V for PIR Sensor
- Random Motion LED Indicator Output
- Triac/Relay Output Interface for AC/DC Applications

LS7231-LS7234 (8 Pin DIP)
Touch Control Continuous Dimmer Light Switch
- Touch or mechanical switch SENSE input control
- Momentary SENSE input activation causes ON/OFF switching
- Prolonged SENSE input activation causes variable dimming
- Brightness Memory and Dimming Direction Reverse features depending on Part Number
- DOZE input for external control of DIM-TO-OFF time
- SLAVE input for control by Remote Extension

LS7631-LS7632 (8 Pin DIP)
Touch Control Halogen Lamp Dimmer Light Switch
- Controls resistive and inductive loads
- Soft-turn on • Automatic safety cutout
- Mode input selects LS7231, LS7232 or LS7233 type operation
- LS7631 - dimming cycles through Maximum and Minimum
- LS7632 - dimming stops at Maximum and Minimum

LS7237 (8 Pin DIP)
Touch Control Step Dimmer Light Switch
- Touch or mechanical switch SENSE input control
- MODE input selects 1, 3, or 4 level Brightness Sequence
- SLAVE input for control by Remote Extension

LS7338 (8 Pin DIP)
Delayed-Off Light Switch with Programmable On-Timer
- Operating Sequence: TIMED-ON —>DELAYED-OFF —> OFF
- Manual or Automatic Sequence Advance
- External RC programs On-Timer
- Transition from Timed-On to Delayed-Off indicated by reduction of light brightness
- Light DIMS-TO-OFF during the Delayed-Off period

LS7339-LS7340 (8 Pin DIP)
Auto Shut-Off Light Switch with Programmable Timer
- ON and OFF input controls • External RC programs Timer
- Timer retriggers with each activation of ON input
- Applications include Timed-On Wall Switch for heat lamps

LS7314-LS7315 (16 Pin DIP)
Touch Control Multi-Level Light Switch
- Touch or mechanical switch input controls
- Up to ten selectable BRIGHTNESS LEVEL inputs
- A selected BRIGHTNESS LEVEL input becomes an output which can drive an LED to indicate the selected Brightness

LS7534-LS7535 (8 Pin DIP)
Touch Control Dimmer Light Switch with Up and Down Controls
- Touch or mechanical switch UP and DOWN input controls
- Momentary UP/DOWN input activation cause ramping to MEMORY ON/OFF states
- Prolonged UP/DOWN input activation cause variable dimming operation towards MAX/MIN Brightness Levels
- DOZE input for external control of DIM-TO-OFF time

LS7538-LS7539 (8 Pin DIP)
Touch Control Step Dimmer Light Switch with AGC
- Touch Sensitivity is independent of Touch Plate Size and Line-Plug Polarity
- Pin selection of three available Brightness Step Sequences
- Applications include Touch Controls for small table lamps to large floor lamps

BRUSHLESS DC MOTOR CONTROLS

LS7260-LS7262 (20 Pin DIP)
Brushless DC Motor Commutator/Controller
- Open or closed loop control of 3 and 4 phase motors
- HALL SENSOR inputs control output commutation sequence for electrical sensor spacings of 60°, 120°, 240° or 300°
- Speed controlled by Pulse Width Modulation of output drivers
- Control inputs include ANALOG SPEED, FORWARD/REVERSE, OUTPUT ENABLE and POSITIVE STATIC BRAKING
- OVERCURRENT SENSING disables output drivers
- Direct drive of FETs (LS7260) and Bipolar Transistors (LS7261/ LS7262)
- 5V to 28V operation

LS7362 (20 Pin DIP)
Brushless DC Motor Commutator/Controller
- Same features as LS7262 except Pulse Width Modulation occurs only in low-side drivers allowing use with High-Voltage motors

LS7560-LS7561 (28 Pin DIP)
Brushless DC Motor Controller
- Single-Chip Open or Closed Loop Motor Controller
- User Selectable Features Include:
  PWM of All Drivers or Low-Side Drivers Only
  Polarity of High Side Drivers
  Static or Dynamic Braking
  60°/300° or 120°/240° Electrical Sensor Spacing
- Level-Sensitive ENABLE
- Cycle-by-Cycle Overcurrent Sensing
- Overcurrent Condition Disables All Drivers (LS7560) or Low-Side Drivers Only (LS7561)
- Fault LED Indicator Output
- 10V to 18V Operation

DYNAMIC SCATTERING LIQUID CRYSTAL DISPLAY DRIVERS

LS7100 (16 Pin DIP)
BCD TO 7 Segment Latch/Decoder/Driver
- Drives Dynamic Scattering Liquid Crystal Displays
- Up to 50V drive per segment output
- 5V to 60V operation • BLANKING and LOAD input controls
- Inputs are TTL and CMOS compatible

LS7110 (16 Pin DIP)
Binary Addressable Latched Eight Channel Demultiplexer/Driver
- Drives Dynamic Scattering Liquid Crystal Displays
- Up to 50V drive per output
- 5V to 60V operation • ADDRESS and LOAD input controls
- Inputs are TTL and CMOS compatible

TELEPHONE LINE CONTROLS

LS7501-LS7510 (16 Pin DIP)
Tone-Activated Telephone Remote Isolation Device
- Circuit activated by Tone with specific Frequency and Duration
- Frequency and Duration values are mask programmable
- 32,768 Hz Crystal Oscillator time-base
- Low power consumption • 4V to 6V operation
- Ten programmed frequencies available
- Applications include Remote Telephone Line Testing, Remote Meter Reading, and Security System Auto-Dialers

AC MOTOR CONTROLS

LS7237 (8 Pin DIP)
AC Motor Speed Sequential Step Controller
- Controls speed of small AC motors
- Touch or mechanical switch input control
- MODE input selects 1, 3, or 4 step speed sequence

LS7310-LS7313 (18 Pin DIP)
Multi-Level AC Motor Speed Controller
- Touch or mechanical switch input controls
- Up to ten selectable SPEED LEVEL inputs
- A selected SPEED LEVEL input becomes an output which can drive an LED to indicate the selected speed
- ON, OFF and PULSE control inputs

LS7314-LS7315 (16 Pin DIP)
Multi-Level AC Motor Speed Controller
- Same features as LS7310-LS7313 except there are no ON and PULSE control inputs

LS7339-LS7340 (8 Pin DIP)
Auto Shut-Off AC Motor Control with Programmable Timer
- ON and OFF input controls
- External RC programs Timer
- Timer retriggers with each application of ON input
- Applications include Auto Shut-Off appliance timers

PROGRAMMABLE DIGITAL LOCKS

LS7220 (14 Pin DIP)
Automotive Ignition Digital Lock Circuit
- 5,040 four digit Combinations (for a 10 number keypad)
- Combinations are hard-wired programmed
- SENSE input enables chip operation
- Save Memory feature saves Unlock Condition for Valet Parking
- SAVE input sets Save Memory and LOCK input resets SAVE Memory
- Save Memory and Lock Status outputs
- Convenience Delay determined by external capacitor
- Static or Momentary Lock Control output

LS7222-LS7223 (20 Pin DIP)
Keyboard Programmable Digital Lock Circuit
- 38,416 four digit Combinations (for a 4 x 4 keypad matrix)
- 3 different user programmable codes
- LS7222 Programmable Codes: Arm, Disarm, Duress
- LS7223 Programmable Codes: Lock 1, Lock 2, Duress
- Lock and Program Status Outputs
- Static and Momentary Lock Control outputs
- Alarm and Tamper Detection outputs

LS7225-LS7226 (14 Pin DIP)
Machine or Area Access Digital Lock Circuit
- 5,040 four digit Combinations (for a 10 number keypad)
- Combinations are hard-wired programmed
- SEQUENCE ENABLE input enables Combination Entry
- Combination Entry time controlled by external capacitor
- Static and Momentary Lock Control outputs
- Tamper Detection output
- Lock Status output

LS7228-LS7229 (16 Pin DIP)
Serial Address Decoder/ 2 Pushbutton Digital Lock Circuit
- 512 nine bit Combinations
- Combinations are hard-wired programmed
- LS7228: Dual pulse train input combination entry
- LS7229: Two pushbutton input combination entry
- Static or Momentary Lock Control output
- Code bit-entry time controlled by external capacitor

APPLICATION NOTE GUIDE

AN	TITLE
101	**Three and Four Phase Brushless DC Motor Controllers Using Pulse-Width Modulation** *LS7260-LS7262, LS7362*
102	**Driving All N-Channel Power FETs with the LS7260/7261/7262 Brushless DC Motor Commutator** *Also LS7362*
103	**Brush DC Motor Drive Using the LS7260/7261/7262 Brushless DC Motor Commutator** *Also LS7362*
104	**Single-Phase Brushless DC Motor Controller Using LS7261/LS7262**
201	**LS7222/LS7223 Program-Mode Lockout**
202	**Programmed Codes Memory Back-Up for the LS7222/LS7223 Using Energy Storage Capacitors**
301	**A Universal Power Control Circuit for Appliances** *LS7310-LS7313, LS7314, LS7315*
302	**Heavy Duty AC Power Control with Automatic Variable Timed Operation and Overload Shutdown** *LS7339, LS7340*
304	**Using a Light Dimmer IC for AC Motor Speed Control** *LS7231-LS7234, LS7237, LS7534, LS7535*
305	**Adapting the LS7339, LS7340 to Single-Pushbutton Control**
306	**Accurately Extending the Timing Range of the LS7338-LS7340**
401	**Self-Scanned Cascade Readout of LS7060 & LS7061** *Also LS7062, LS7063*
501	**Filtering the Quadrature Inputs to the LS7166**
601	**Backlash Compensation with LS7083 in Unidirectional Motion Controllers**
701	**A Transformer Secondary Electronic Dimmer for Low Voltage Halogen Lamps** *LS7231-LS7234, LS7237, LS7534, LS7535*
702	**A Touch Control Switch for Fluorescent Lamps** *LS7539*
703	**Using the LS7538, LS7539 in a Wall Switch**
704	**Using the LS7340 as an On-Off-Delayed Off Light Switch**
705	**A Dual Dimming Control Light Switch with Unique Delayed Off Feature** *LS7535*
706	**DC Touch Control Switch with Delayed-Off** *LS7539*
1001	**Using the LS7210 as a State-Generator for a Blower-Motor Controller**
1002	**Precision Very Long Time Pulse Generators Using the LS7210**

PACKAGING OPTIONS

Probed Wafers • Waffle-Packed Dice • SOIC • Cerdip • Ceramic • Ceramic-Military versions of a product can be ordered in addition to the Standard Plastic DIPs.
Contact factory for details.

LSI/CSI

ANALOG AND DIGITAL

full custom integrated circuits

LSI COMPUTER SYSTEMS, INC., headquartered in Melville, L.I., New York, has been designing and manufacturing full custom and standard LSI circuits since 1969.

Utilizing a broad array of LSI process technologies, the range of products produced extend from the consumer and industrial marketplace to military and aerospace applications.

Custom LSI circuits have become an important factor in today's electronics industry. The advantages of space reduction, lower power consumption and cost effectiveness are well known. The addition of increased system reliability due to fewer interconnections and the exclusivity that unique design lends to the finished system can result in both enhanced product image and significant cost savings to the user.

LSI/CSI has a proven track record for producing well designed, high quality LSI circuits in large volume. Customer's designs may be as thorough as data base tapes, detailed schematics and logic drawings or as simple as a conceptual idea. Our design engineers, using CAE and CAD equipment will perform circuit and LSI design, schematic capture, simulations, layout and verification prior to the creation of photomasks.

All circuits are 100% tested in both wafer form prior to assembly and as packaged devices prior to final shipment utilizing advanced ATE.

Package options include conventional plastic DIPs, small outline (SOIC) packages for surface mounting and ceramic packages for high temperature and military applications. Burn-in and screening to Mil-Std 883 are available.

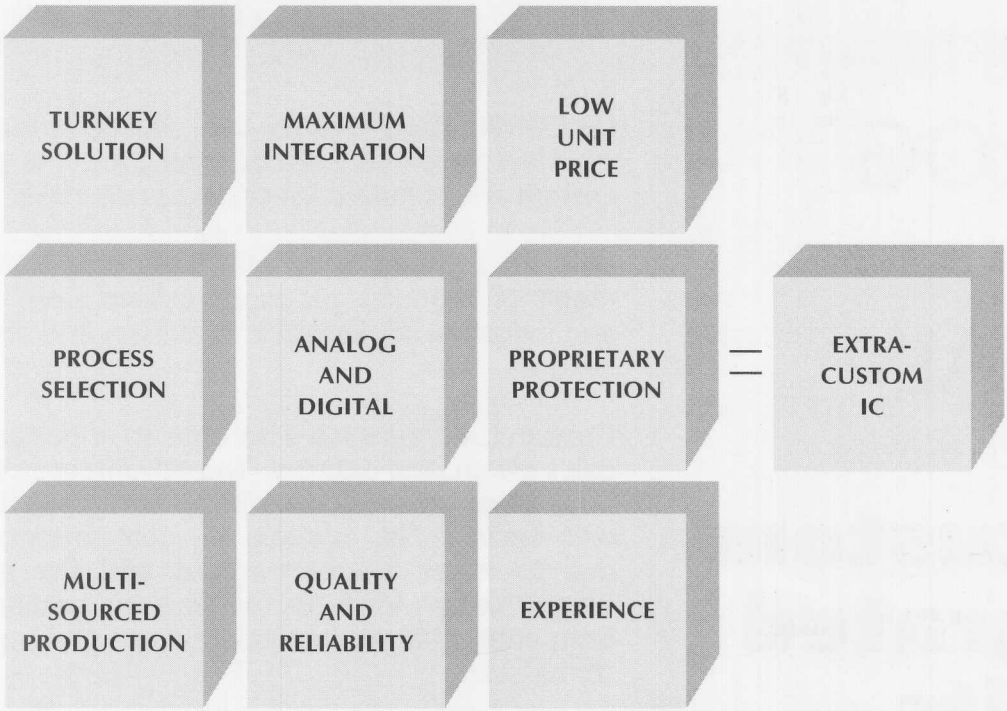
The in-depth involvement on the part of our staff ensures that your circuit is both initially optimized for its application and supported technically throughout its life cycle. We guarantee your success.

ISO 9002 UL REGISTERED FIRM A3800

LSI COMPUTER SYSTEMS, INC.
1235 Walt Whitman Road
Melville, NY 11747-3086

Telephone (516) 271-0400
Fax (516) 271-0405

BENEFITS OF AN LSI/CSI EXTRA-CUSTOM IC



Extra-Custom is our **Analog and Digital** Full Custom Service that provides **benefits** which are not available with Gate Array, Standard Cell and Microprocessor solutions. Extra-Custom is the complete **Turnkey Solution** to your Custom IC needs.

We use our system and circuit design expertise to innovate solutions to your System Integration requirements. You **benefit** because your Extra-Custom IC is the **Maximum Integration** solution that includes all the functions which can be integrated.

We use Wafer Foundries that offer a broad range of LSI Process Technologies. You **benefit** because we can **Select the LSI Process** that is right for your application.

We optimize circuit design and layout to reduce function area, interconnect and pin count. You **benefit** because an optimized IC provides **High Performance and Reliability** along with a **Low Unit Price.**

We design-in **Testability** and develop a **Test Program** to efficiently and effectively test the IC on our advanced ATE. You **benefit** because a properly tested IC is a **Quality Component.**

We can procure from several reliable sources at each step of the Manufacturing Process. You **benefit** because your Extra-Custom IC is supported by our **Multi-Sourced Production** capability.

We custom design every detail of your Extra-Custom IC so that your competition won't easily decipher the techniques employed. You **benefit** because you have the ultimate in **Proprietary Protection** for your product.

We provide **Technical Support** throughout your product's life cycle. You **benefit** because we help guarantee your product's success.

We have been satisfying demanding high-volume custom IC requirements **since 1969.** You **benefit** because you have our **Experience** working for you.

LSI/CSI

LSI Computer Systems, Inc.
1235 Walt Whitman Road
Melville, NY 11747-3086

TEL. (516) 271-0400
FAX (516) 271-0405